

**EXPLORING BIOMIMETIC ARCHITECTURAL PRINCIPLES IN THE
DESIGN OF A PUBLIC LIBRARY IN MPAPE, ABUJA**

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JULY, 2024

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**A DISSERTATION SUBMITTED TO THE SCHOOL OF
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ARCHITECTURE, COLLEGE OF SCIENCE AND TECHNOLOGY,
COVENANT UNIVERSITY, OTA, OGUN STATE, NIGERIA**

JULY, 2024

ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfilment of the requirements for the award of the degree of Master of Science (M.Sc) in the Department of Architecture, College of Science and Technology, Covenant University, Ota, Nigeria and has been accepted by the School of Postgraduate Studies, Covenant University, Ota, Ogun state.

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DECLARATION

I, **ADAMOLEKUN, AYODAMOPE MOFEBISARA (22PCA02564)**, declare that this dissertation is a representation of my work, and is written and implemented by me under the supervision of Dr. Eghosa N. Ekhaese of the Department of Architecture, Covenant University, Ota, Nigeria. I attest that this dissertation has in no way been submitted either wholly or partially to any other university or institution of higher learning for the award of a masters' degree. All information cited from published and unpublished literature has been duly referenced.

ADAMOLEKUN, AYODAMOPE MOFEBISARA

Signature and Date

CERTIFICATION

This is to certify that this dissertation titled **“EXPLORING BIOMIMETIC ARCHITECTURAL PRINCIPLES IN THE DESIGN OF A PUBLIC LIBRARY IN MPAPE, ABUJA”** is an original research work carried out by **ADAMOLEKUN, AYODAMOPE (22PCA02564)** in the Department of Architecture, College of Science and Technology, Covenant University, Ota, Ogun state, Nigeria under the supervision of Dr. Eghosa N. Ekhaese. This dissertation has met the required standard for the award of Master of Science (M.Sc.) in Architecture.

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DEDICATION

This research work is dedicated first and foremost to God Almighty, the custodian of all wisdom, knowledge, and understanding, for His grace and favour throughout the duration of carrying out this research, then to my family for their endless support and love.

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ABSTRACT

Over time, it has become increasingly evident that humans possess an inherent need to connect with their natural environment. This connection extends beyond aesthetics; it influences our well-being, productivity, and overall quality of life. In the context of architectural design, biomimetics—the practice of drawing inspiration from nature—has emerged as a promising avenue for creating more sustainable, user-friendly spaces. Acknowledging this, the study assesses ways to apply the insights gained from exploring biomimetic architectural principles and their impact on ergonomics in libraries located in Abuja, Nigeria. The study’s primary focus is biomimetic architecture and the effect it has on ergonomics. Given Abuja’s blend of diverse cultures and knowledge, its central position within the country, and its unique location-based characteristics, we selected it as our study location. This research adopts a pragmatic philosophy, employing a mixed-method research approach, we used convenience sampling to choose the libraries to select respondents. The study focused on 280 respondents from all over the country, utilizing observation guides and questionnaires to gather as much information. Our findings revealed a significant gap: the chosen libraries did not actively implement biomimetic architectural principles. However, respondents consistently highlighted the impact of these principles on ergonomics. Respondents expressed a preference for libraries with abundant natural light, greenery, and views of outdoor spaces. Biomimetic materials—such as those inspired by natural textures, patterns, and resilience—were rarely present. Yet, respondents recognized their potential to enhance ergonomics. Libraries that incorporated organic shapes, flexible seating arrangements, and adaptable spaces received favourable feedback. These features contributed to a more comfortable reading experience. Additionally, the study highlighted the influence of these principles on ergonomics. By applying biomimetic architecture in libraries, this study exposes opportunities to have more comfortable spaces that enable long-term reading. The findings of this study benefit a wide range of stakeholders, including residents, architects, designers, avid readers and the overall community of Abuja, Nigeria. Based on these results, we developed a library design proposal that prioritizes biomimetic architectural principles to enhance ergonomics within the library space.

Keywords: Public Library, Ergonomics, Biomimicry, Avid reader, User’s Comfort.